

## REMARKS

The Office Action dated October 14, 2004 has been fully considered. Claims 1-9 and 12-13 are pending in this application.

Applicant appreciates Examiner's indication of allowability of claim 2 at paragraph 4 on page 3.

In paragraph 3 on page 3 of the Office Action, claims 1, 3-9, 12, and 13 were rejected under 35 U.S.C. § 103(a) over Takuji (Japanese Patent No.: JP 10-256621) in view of the Journal of Applied Physics article "Oxygen as a Surfactant in the Growth of Giant Magnetoresistive Spin Valves" by Egelhoff et al.

Applicant respectfully traverses the 35 U.S.C. § 103(a) rejection. Applicant respectfully asserts that the requirements for a §103(a) rejection are not present and a prima facie rejection fails because the Office Action fails to cite a reference or references that teach, disclose or suggest all the claim limitations of Applicant's application.

Applicant's invention requires "forming a copper seed layer in a NiMn top spin valve, oxidizing the copper seed layer in the NiMn top spin valve and depositing remaining layers of the NiMn top spin valve head including a NiMn pinning layer having a thickness of less than 200 Å.

Takuji merely teaches a magnetoresistance effect material with a Zr-Cu laminate, CoFe, Cu, CoNiFe, and NiFe layers. As admitted in the Office Action, Takuji does not disclose "copper seed 3 and copper spacer layer 5 being oxidized with oxygen after deposition and before a subsequent layer is formed." Office Action, Page 2.

Egelhoff fails to remedy the deficiencies of Takuji. According to MPEP § 2141.02, "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." Egelhoff, at page 6145, Fig. 2, shows a graph of Cu thickness vs. Coupling for bottom spin valves deposited entirely in the presence of O<sub>2</sub> (a), with O<sub>2</sub> deposited only on Cu spacer layer (b), and without O<sub>2</sub> (c). The graph shows that spin valves formed entirely in the presence of O<sub>2</sub> has a coupling field smaller than any of the measurements taken of the samples formed using O<sub>2</sub> only on the Cu spacer layer. Furthermore, Egelhoff states "the best spin valves are produced by deposition in a

continuous background of  $5 \times 10^{-9}$  Torr ( $7 \times 10^{-7}$  Pa)  $O_2$ .” In view of Fig. 2 and the above statement, Egelhoff discloses that a background of  $O_2$  for the entire fabrication process is better than oxidizing only the copper spacer layer. Therefore, Egelhoff teaches away from Applicant’s “oxidizing the copper seed layer in the NiMn top spin valve.”

Furthermore, Egelhoff does not mention forming a copper seed layer in a NiMn top spin valve or depositing remaining layers of the NiMn top spin valve head including a NiMn pinning layer having a thickness of less than 200 Å. Therefore, Egelhoff fails to disclose, teach or suggest “oxidizing the copper seed layer in the NiMn top spin valve.”

Moreover, Applicant’s application identifies the problem of inter-diffusion of spin valve head layers due to heating a NiMn spin valve sensor to temperatures greater than 225°-240° C. for more than 2-3 hours (*see* page 5, lines 9-12); and addresses the problem by developing a method for “precise control of magnetic coupling field in NiMn top spin valve heads and amplitude enhancement” using oxidized copper layers (page 7, lines 11-13).

Takuji does not recognize the problem of inter-diffusion of spin valve head layers due to heating NiMn spin valves. Takuji merely addresses a new construction of a spin valve type magnetoresistance effect material and includes NiMn as one of the available layers to be used in constructing spin valves.

Egelhoff clearly also fails to recognize the above-mentioned problem because Egelhoff does not even identify NiMn as a material used in fabricating spin valves, nor does Egelhoff recognize the problem with bulk and interfacial magnetostriction posed by the annealing process when a NiMn layer is used.

Takuji and Egelhoff alone or in combination, fail to disclose, teach or suggest all of the limitations of Applicants’ application. Thus the § 103(a) rejection is improper. Accordingly, Applicants request that the §103 rejection be withdrawn.

Dependent claims 2-9, 12, and 13 are also patentable over the reference because they incorporate all of the limitations of the corresponding independent claim. Further, dependent claims 2-9, 12, and 13 recite additional novel elements and limitations. Applicant reserves the right to argue independently the patentability of these additional novel aspects. Therefore, Applicant respectfully submits that dependent claims 2-9, 12, and 13 are patentable over the cited patent.

Moreover, with respect to the § 103(a) rejection of the claims, the alleged motivations for making the asserted combinations are improper for being conclusory and lacking supporting evidence. According to MPEP § 2143.01, “[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” The Office Action, rejection of the claims are not given supporting evidence. The alleged motivation for making the Takuji-Egelhoff combination is “it would have been obvious to one of ordinary skill in the art at the time the invention was made to oxidize the copper layers in the spin valve of JP’621 as taught by Egelhoff as doing this would enhance the GMR effect over that of a non-oxidized spin valve head, and would increase the beneficial specular reflection of electrons by creating a smoother or more well ordered growth pattern of the layers as taught by Egelhoff.” The motivation is improper because no evidence is provided to indicate that the process in Takuji results in a lack of sufficient GMR effect or that a rough or that a disordered growth pattern of the layers is present. Nowhere in the Office Action is there a reference to Takuji indicating the asserted combination would be desirable. Therefore, the alleged motivations are improper.

Applicant respectfully raises the issue of the reliance on an abstract and associated untranslated foreign document as prior art. According to MPEP § 706.02 “If the [prior art] document is in a language other than English and the examiner seeks to rely on that document, a translation must be obtained so that the record is clear as to the precise facts the examiner is relying upon in support of the rejection.” Because the office action points to column 2 of the untranslated document as support for the § 103(a) rejection, and Applicant does not have a translated version of the Takuji reference, it is unclear how the Office Action can accurately associate Takuji with Egelhoff.

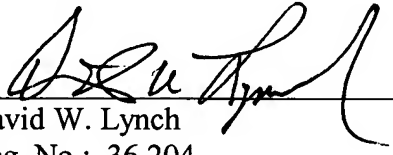
Application No. 10/038,125  
Amendment January 14, 2005  
Reply to Office Action of October 14, 2004

On the basis of the above amendments and remarks, it is respectfully submitted that the claims are in immediate condition for allowance. Accordingly, reconsideration of this application and its allowance are requested. Please charge/credit Deposit Account No. 50-0996 (IBMS.034US01) for any deficiencies/overpayments.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Attorney for Applicants, David W. Lynch, at 651-686-6633 Ext. 116.

Respectfully submitted,

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